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IS 7606 (1982): Plain Adjustable Snap Gauges [PGD 25:
Engineering Metrology]



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Indian Standard

SPECIFICATION FOR PLAIN ADJUSTABLE SNAP GAUGES

(First Revision)

1. Scope — Covers the requirements of plain adjustable snap gauges of four types, in the size range 0 to 300 mm.

2. Nomenclature — For the purpose of this standard the nomenclature as given in Fig. 1 shall apply.

Note — A typical snap gauge has been shown in Fig. 1.

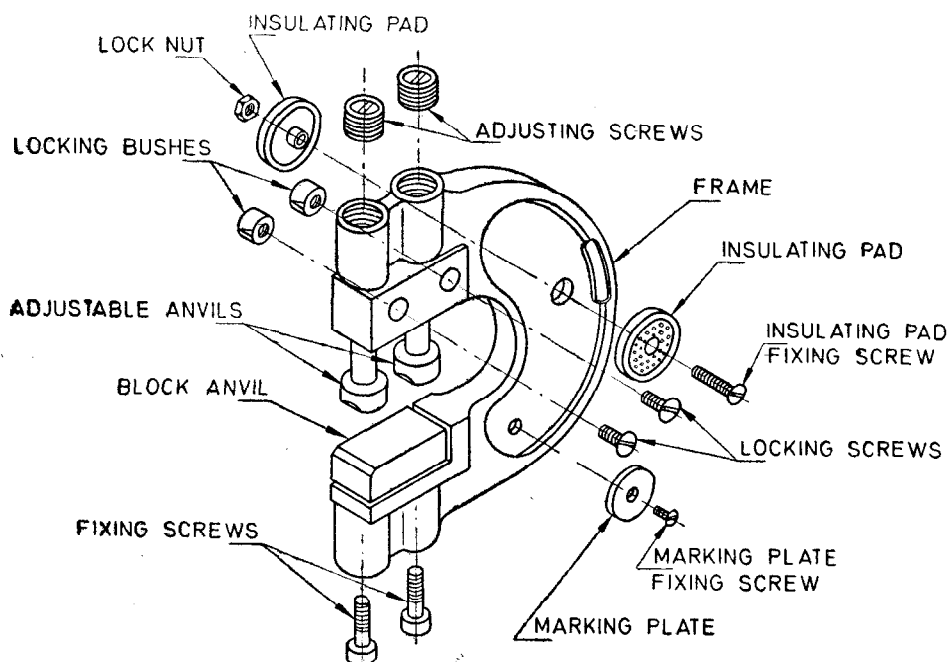


FIG. 1 NOMENCLATURE FOR PLAIN ADJUSTABLE SNAP GAUGE

3. Types — The plain adjustable snap gauges covered in this standard are of four types, namely Type A, Type B, Type C and Type MC.

3.1 Type A — Employing four adjustable gauging anvils of pin type. This type is useful when dimensions in grooves are to be measured, however the minimum groove width is limited by diameter of anvils (see Fig. 2).

3.2 Type B — Employing four adjustable anvils either square or round. Square anvils are suitable to measure against shoulder on work piece (see Fig. 3).

3.3 Type C — Employing two adjustable gauging anvils either square or round and a single block anvil. Ensures correct location and reduces the wear of the measuring surfaces of the anvil (see Fig. 4). Provision of a groove between the GO and NO GO portion on the fixed anvil is optional.

3.4 Type MC — A miniature snap gauge employing two adjustable anvils either square or round and a single block anvil (see Fig. 5). This type is particularly useful for gauging of small diameter components and measurements against shoulders of such components.

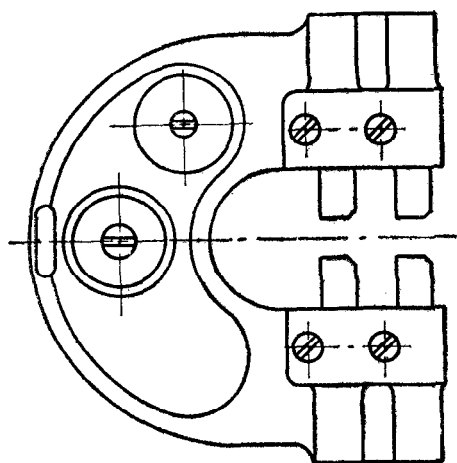


FIG. 2 TYPE A GAUGE

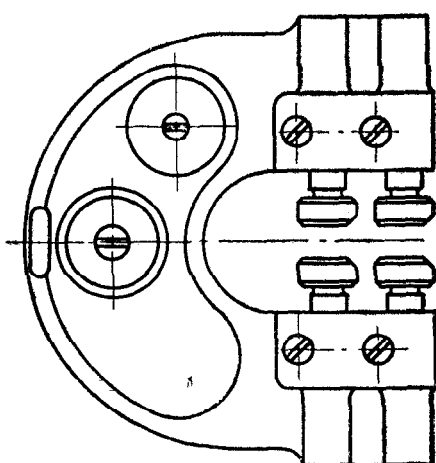


FIG. 3 TYPE B GAUGE

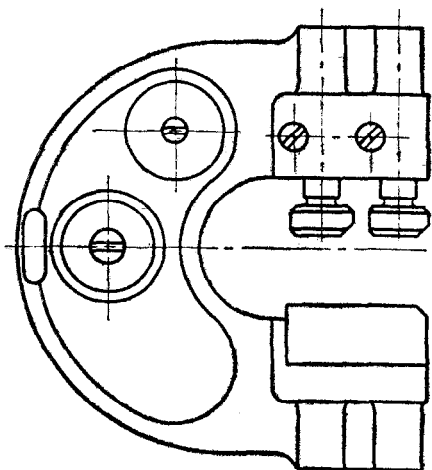


FIG. 4 TYPE C GAUGE

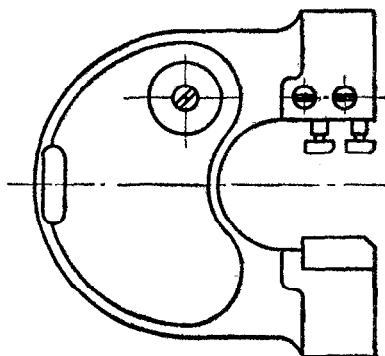


FIG. 5 TYPE MC GAUGE

4. Dimensions — The dimensions of adjustable snap gauges shall be as given in Tables 1 and 2.

5. Material and Hardness

5.1 Frame — A grey cast iron of basically pearlitic microstructure is recommended. Other materials may be used provided their characteristics are similar or better than the above. Frames should be adequately stabilized either by ageing or by a more complex heat treatment.

5.2 Adjustable Anvils — Adjustable anvils shall be made from suitable quality steel selected from IS : 7018-1973 'Technical supply conditions for gauges: Part I General.' The sliding surface of anvils shall be finished by grinding and the gauging surface, shall be fine lapped. The hardness of the anvils shall be between 650 and 750 HV (56 to 62 HRC approximately) [see IS : 1501-1968 'Method for Vickers hardness test for steel (first revision)].

5.3 Other Parts — The other parts of an adjustable snap gauges shall be of a quality compatible with the requirements of the type of gauge, and shall be free from sharp corners or other dangers likely to cause bodily injury in use. The material of all parts shall be of good quality and free from flaws.

6. General Requirements

6.1 Frame — The frame shall be of semi-circular or conventional C shape and shall be designed in such a way that it shall be sufficiently strong to withstand workshop conditions without being unduly heavy, with minimum deflection while in operation. Each frame shall be marked with its size range.

6.2 Adjustable Anvil — The adjustable or sliding anvil in Type A shall be of circular section, bevelled at front edge to facilitate correct positioning and entry of the component while measuring.

6.2.1 Sliding anvils in Types B, C and MC shall be with either circular or square heads, the former bevelled at front and the later chamfered on their front edges for guiding the work.

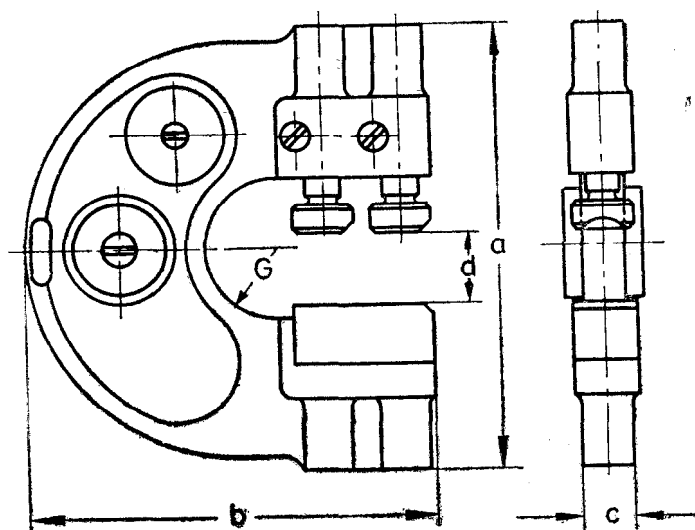
6.2.2 The distance between the GO and NO GO adjustable anvils shall be sufficient when the gauge is set for work of the largest diameter and largest tolerances, to permit the work to be in a 'free' position when past the GO anvils and before meeting the NO GO anvils.

6.2.3 The gauging anvils shall have only a sliding movement for adjustment. The anvils shall be of sufficient length of bearing on their shank to ensure parallel movement when being adjusted and to obviate any tendency to trip when being locked or when in use. All sliding anvils shall be of close fitting.

TABLE 1 DIMENSIONS FOR TYPES A, B AND C ADJUSTABLE SNAP GAUGES

(Clause 4)

All dimensions in millimetres



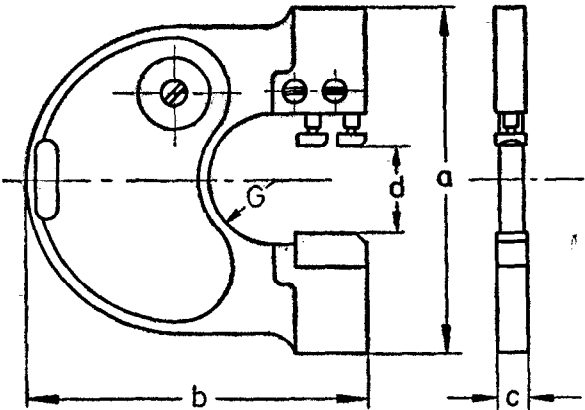
| Size Range d | | | | | | a | b | c | G Min |
|--------------|---------------------|--------|---------------------|--------|---------------------|-----|-----|----|----------|
| Type A | | Type B | | Type C | | | | | |
| Over | Up to and Including | Over | Up to and Including | Over | Up to and Including | | | | |
| 0 | 13 | | | 0 | 6 | 74 | 71 | 12 | 11 |
| | | | | 6 | 13 | 85 | 79 | 12 | 14 |
| 13 | 25 | 0 | 13 | 13 | 19 | 93 | 83 | 12 | 18 |
| | | | | 19 | 25 | 100 | 89 | 12 | 21 |
| 25 | 38 | 13 | 25 | 25 | 32 | 111 | 103 | 15 | 23 |
| | | | | 32 | 38 | 117 | 105 | 15 | 26 |
| 38 | 50 | 25 | 38 | 38 | 44 | 123 | 109 | 15 | 29 |
| | | | | 44 | 51 | 130 | 116 | 15 | 32 |
| 50 | 63 | 38 | 50 | 51 | 57 | 136 | 119 | 15 | 32 |
| | | | | 57 | 63 | 143 | 121 | 15 | 39 |
| 63 | 76 | 50 | 63 | 63 | 70 | 156 | 131 | 15 | 42 |
| | | | | 70 | 76 | 163 | 136 | 15 | 46 |
| | | | | 76 | 82 | 169 | 139 | 15 | 49 |
| 76 | 95 | 63 | 76 | 82 | 89 | 175 | 145 | 15 | 52 |
| | | | | 89 | 95 | 181 | 149 | 15 | 55 |
| | | | | 95 | 101 | 188 | 154 | 15 | 58 |
| 95 | 114 | 76 | 95 | 101 | 108 | 198 | 164 | 15 | 63 |
| | | | | 108 | 114 | 204 | 170 | 15 | 66 |
| | | | | 114 | 120 | 210 | 177 | 15 | 69 |
| 114 | 133 | 95 | 114 | 120 | 127 | 217 | 183 | 15 | 73 |
| | | | | 127 | 133 | 223 | 192 | 15 | 76 |
| | | | | 133 | 139 | 229 | 197 | 15 | 79 |
| 133 | 152 | 114 | 133 | 139 | 146 | 235 | 201 | 15 | 82 |
| | | | | 146 | 152 | 242 | 205 | 15 | 85 |
| | | | | 152 | 163 | 278 | 211 | 18 | 90 |
| | | | | 163 | 175 | 278 | 211 | 18 | 90 |
| | | | | 175 | 188 | 303 | 227 | 18 | 108 |
| | | | | 188 | 200 | 303 | 227 | 18 | 108 |
| | | | | 200 | 213 | 328 | 242 | 18 | 120 |
| | | | | 213 | 225 | 328 | 242 | 18 | 120 |
| | | | | 225 | 238 | 353 | 250 | 18 | 135 |
| | | | | 238 | 250 | 353 | 250 | 18 | 135 |
| | | | | 250 | 263 | 378 | 275 | 18 | 150 |
| | | | | 263 | 275 | 378 | 275 | 18 | 150 |
| | | | | 275 | 288 | 403 | 291 | 18 | 165 |
| | | | | 288 | 300 | 403 | 291 | 18 | 165 |

Note — Overall dimensions are given for guidance only.

TABLE 2 DIMENSIONS FOR TYPE MC ADJUSTABLE SNAP GAUGES

(Clause 4)

All dimensions in millimetres.



| Size Range d | | a | b | c | G |
|--------------|---------------------|----|----|---|----|
| Over | Up to and Including | | | | |
| 0 | 5 | 57 | 58 | 6 | 8 |
| 5 | 10 | 57 | 58 | 6 | 8 |
| 10 | 15 | 67 | 68 | 6 | 13 |
| 15 | 20 | 67 | 68 | 6 | 13 |

6.3 Insulating Pad — An insulating of suitable material may be provided to insulate the snap gauge against heat transfer caused by handling.

6.4 Marking Plate — A Marking plate which could easily be attached to the frame in such a way that it does not interfere with the operation of the gauge and which is capable of being readily changed shall be provided for marking the size to which the gauge has been set.

6.5 Locking Device — A suitable locking device between the shank of the adjustable anvil and bush shall be provided in such a way that the anvil shall only have sliding and not rotating movement, for adjustment.

6.6 Sealing — Suitable provision for sealing the adjustment shall be provided to prevent unauthorised readjustment.

7. Setting — Setting either by slip gauges or by means of setting plugs is recommended. The method of adjusting the anvils on gauges shall be by means of independent, finely threaded screws at the back end. Final locking in position should be done by means of locking screws.

8. Accuracy

8.1 The error in parallelism of measuring surfaces during adjustment within measuring range shall not exceed the values specified in Table 3 over the entire range.

TABLE 3 ACCURACY LIMITS

(Clause 8)

| Range (mm) | | Maximum Deviation in Parallelism μm | |
|--------------|---------------------|--|--------------|
| Over | Up to and Including | C and MC Type | A and B Type |
| 0 | 32 | 3 | 4 |
| 32 | 89 | 4 | 6 |
| 89 | 152 | 5 | 7 |
| 152 | 300 | 5 | — |

Note — Parallelism can not be maintained after setting, due to stresses and resilience arising when the locking screws are tightened. For use in case of vary narrow limit, it is therefore, advisable for plane measuring faces to be lapped at correct measuring value arter setting, and setting is to be done by setting plugs of the correct size rather than combination of slip gauges which would not offer the same delicacy of feel.

8.2 The error of flatness of measuring surface of anvils should not exceed $1.5 \mu\text{m}$.

9. Designation — The plain adjustable snap gauges shall be designated by the type, size range and the number of this standard.

Example:

A Plain adjustable snap gauge of Type C with 13-19 mm size range shall be designated as:

Plain Adjustable Snap Gauge C13-19 IS : 7606.

10. Tests

10.1 Parallelism — The parallelism of gauge within the range of measurement should be checked at least at 3 different settings and the error in parallelism should be within the values given in 8.

11. Packing — Each plain adjustable snap gauge shall be coated with suitable anti-corrosive coating on gauging and other important surfaces, and shall be wrapped in a moisture proof paper or any other suitable wrapping material. The gauges shall be supplied in suitable protective cases.

12. Marking — Each plain adjustable snap gauge shall be marked with its frame number, size range on the space provided and the manufacturer's name or trade-mark.

12.1 ISI Certification Marking — Details available with the Indian Standards Institution.

EXPLANATORY NOTE

This standard deals with four types of plain adjustable snap gauges. It covers mainly the dimensions and accuracy. The use of adjustable snap gauge is normally recommended for measurement of components having a tolerance of IT8 and above. However, the use may be extended to closer tolerances provided the gauge is lapped after setting. It would be necessary to give an attention to the fact that adjustable snap gauge is an assembly of various components and when tightened in position or set to any size, stresses are induced in members thus creating non-parallelism between measuring faces. Therefore, use of adjustable snap gauges should be avoided while gauging to closer tolerances.

This standard was published originally in 1975 and was based on BS : 1044-1942 'Recommended design for gauges' and CS 8-1961 'Gauge blanks'.

Present revision incorporates the following changes:

- a) Table I has been modified on the basis of current practices followed in different countries.
- b) Since many designs of adjustable snap gauges are prevalent, some of the details regarding design, such as anvil design, castings dimension, etc, have been deleted from the typical design indicated in the earlier version.
- c) A groove was shown on fixed anvil in the earlier version. In view of the difficulties encountered in application of the gauges with a groove on the fixed anvil, the same has not been provided in this standard.
- d) The limits for parallelism accuracies have been revised since the accuracy of 0.003 m provided in the earlier version were found to be impracticable to achieve. The present table for accuracy limits (see Table 3) is based on the accuracy limits of a European manufacturer, suitably amended keeping in view the gauge manufacturing tolerances for IT 8 limits.